No. 62 May 1995

solplan review

the independent journal of energy conservation, building science & construction practice

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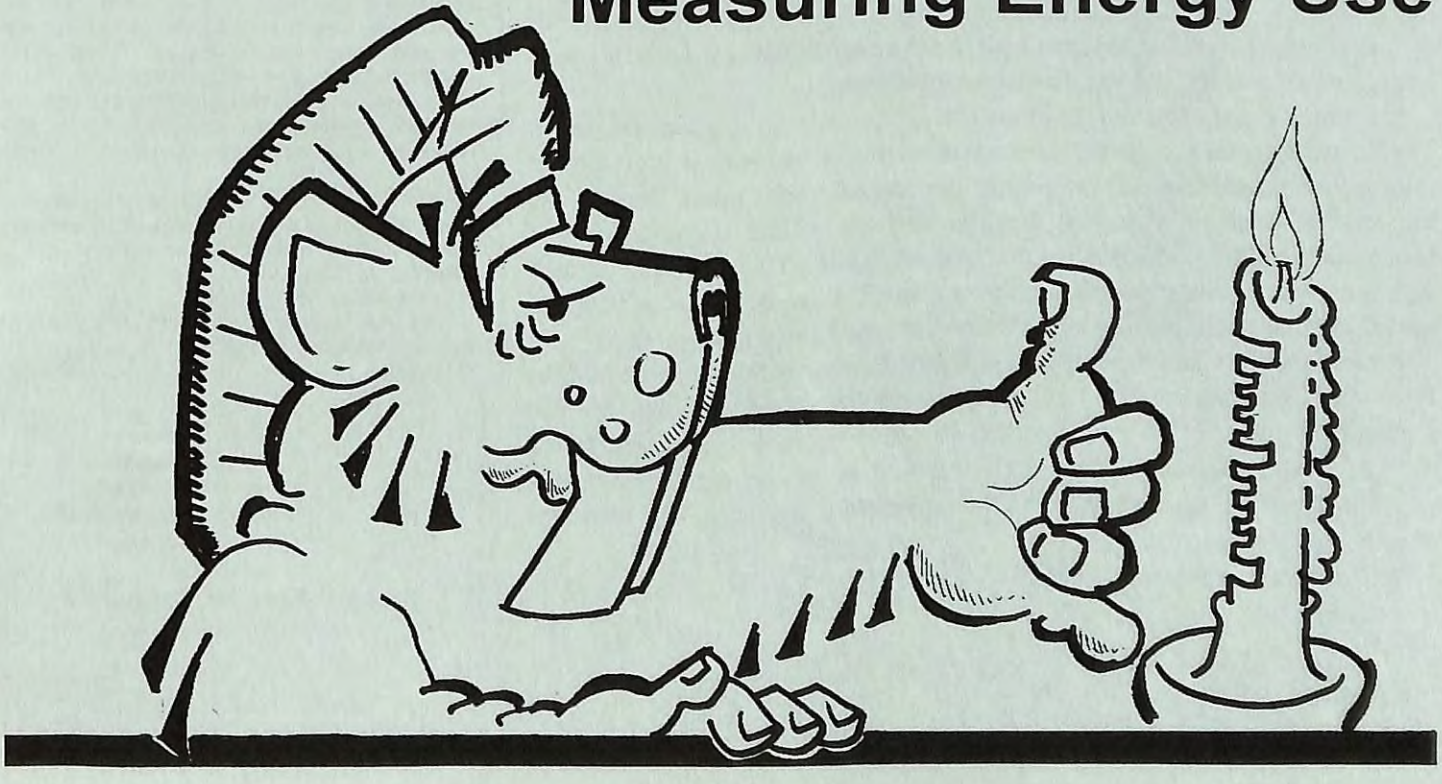
Measuring Energy Use



From the Editor . . .

I've often talked about regulations, and how we need to have some in order to maintain a minimum standard for human activities. Without any regulation, we tend to see a wild west atmosphere that creates irresponsible behaviour with devastating consequences for society and the environment.

Yet I sympathize with those who want to simplify regulations. Sometimes, I wonder if regulators have a death wish, for it is their excesses that feed the de-regulators and discredit the reasonable regulations that we need. I don't know if the excesses of some rules come from a power trip on the part of some, a group dynamic that feeds on itself in isolation, or whether it's the overabundance of lawyers looking for make-work projects that put the fear of litigation into everyone, so every bureaucrat has to cover their behind.

What's happened to common sense?

A couple of recent incidents have underlined regulatory excesses. In one Vancouver project, even though the installation and location of an electrical transformer met all written regulations, the regulatory authority would not accept it because "*If* a person was standing on the unit during an earthquake *and* the earthquake shorted out the transformer, *and* it happened to be raining, *and* the person reached over to touch the steel handrail, they could be electrocuted" (I'm not making this one up!)

Another project I am grappling with is an addition of a garage/workshop building to a single family house that meets all municipal zoning requirements, and has received the appropriate permits. However, because the owner would like to add a bathroom into the addition (not at all unreasonable to the overall project concept), the Health department has to be involved because the house is located on an acreage and has its own septic system.

Unfortunately, the Health Department (at least in BC) is a kingdom unto itself. The health inspector got upset because construction started without his approval (although the bathroom was not part of the original application). Further, the inspector is taking for granted that the addition will be converted into a residential dwelling. and is treating it as such, even though the owner has no such intent, nor does zoning permit such a use. In other words, "you're guilty of something that might happen in the future because I say you might do it"!

It's not just the Canadian building industry that's being hit. It seems that the European Common market regulators have defined that a strawberry has minimum diameter of 25 mm. Swedish strawberry farmers (because of their more northern climate) can't grow such large fruit, so they are not allowed to call their strawberries "strawberries"! (But apparently they can use them for strawberry jam).

Will common sense ever prevail?

Richard Kadulski
Editor

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Editor-Publisher: Richard Kadulski
Illustrations: Terry Lyster
Contributors: Don Buchan, Steve Carpenter, John Bower, John Rye, Patrick Sommer, Stephen Thwaites, Conroy Schelhass, David Hill, Ross Monsour, Robert Fraser,
ISSN: 0828-6574
Date of Issue: June 1995
SOLPLAN REVIEW is published 6 times per year by:
the drawing-room graphic services ltd.
Box 86627, North Vancouver, B.C. V7L 4L2
Tel: 604-689-1841 Fax: 604-689-1841

Street address:
208-1280 Seymour St.
Vancouver, B.C. V6B 3N9

Canadian Publications Mail Product Sales Agreement No. 454532
Postage paid in Vancouver, B.C.
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PRINTED IN CANADA
GST Registration: R105208805
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design & consulting
energy efficient building
consulting services
R-2000 design evaluations
HOT-2000 analysis

Richard Kadulski Architect

#208 - 1280 Seymour St.
Vancouver, B.C. V6B 3N9
Tel: (604) 689-1841
Fax: (604) 689-1841

Household Energy Use

The work on new energy standards for buildings, such as the proposed National Energy Code raises the question: what influence will a given action have? What happens if higher insulation levels are required, or more efficient appliances are mandated?. To be able to answer these questions, you have to know how energy is presently used, and how much is being used.

We are told that the residential sector uses about 20% of all energy used in the country (not including transportation). But it seems that up to now much of our knowledge about household energy use has been best guesses, probably largely determined from utility data.

Statistics Canada conducted a Survey of Household Energy Use in 1993 for the first time ever, on behalf of Natural Resources Canada (NRCan), in cooperation with the provinces of Nova Scotia, New Brunswick, Ontario, Manitoba and Saskatchewan.

The objective was to provide detailed information about Canadian household energy consumption habits with an emphasis on:

- energy consuming appliances and equipment;
- characteristics and state of the dwellings;
- profiles of consumers, including consumption habits

The goal is to develop a National Energy Use Database that will give a comprehensive portrait of energy use in Canada for all consumer sectors: residential housing, commercial and institutional, industrial and transportation. This will support energy efficiency programs and help to monitor and assess Canada's progress toward the goal of stabilizing greenhouse gas emissions.

The information gives an interesting cross Canada picture of Canada's housing picture. The biggest problem with this survey, unfortunately, is that the material is only presented for the country overall, and does not provide any regional breakdowns. Having some data broken down on a regional basis would have been helpful, as climatic and economic differences shape housing design and equipment selection and use.

For example, while heating oil and wood are not significant fuels in the Canadian market, considered from the national point of view, there are many areas, especially in Atlantic Canada, where because there is no natural gas, the situation is significantly different.

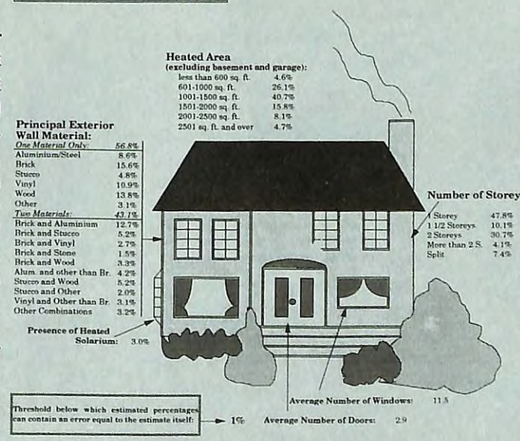
Another example where a national profile of the average house has shortcomings is the distribution of basements and crawlspaces. In most of the country it is standard practice to build a house on a full basement (70.8% of all houses have them). But on the West coast, houses are commonly built on crawl spaces or even slab-on-grade.

In addition, other studies have noted that there is a distinct variation in the average size of houses in different regions. It may seem like nit-picking but energy use, especially for space heating and ventilation, is very much affected not only by the climate but also by the size of the house. Thus using a "typical" house profile determined by cross Canada average may not be sensitive enough for policy objectives when regulations are drafted, unless regional sensitivities are taken into account.

It's not unlike saying that each house has an average occupancy of 2.63 persons. Who knows what a .63 person looks like?

Diagram 2.1.1a
Characteristics of the Thermal Envelope
- General Characteristics -

All houses	
Date of Construction:	All
Number of Houses:	7,135,000


Heated Area
(excluding basement and garage):
less than 600 sq. ft. 4.6%
601-1000 sq. ft. 26.1%
1001-1500 sq. ft. 40.7%
1501-2000 sq. ft. 15.8%
2001-2500 sq. ft. 8.1%
2501 sq. ft. and over 4.7%
Principal Exterior Wall Material:
One Material Only: 56.6%
Aluminium/Steel 8.6%
Brick 15.6%
Stucco 4.8%
Vinyl 10.9%
Wood 13.8%
Other 3.1%
Two Materials: 43.1%
Brick and Aluminium 12.7%
Brick and Stucco 5.2%
Brick and Vinyl 2.7%
Brick and Stone 1.5%
Brick and Wood 3.3%
Alum. and other than Br. 4.2%
Stucco and Wood 5.2%
Stucco and Other 2.0%
Vinyl and Other than Br. 3.1%
Other Combinations 3.2%
Presence of Heated Solarium: 3.0%
Number of Storeys:
1 Storey 47.8%
1 1/2 Storeys 10.1%
2 Storeys 30.7%
More than 2 S. 4.1%
Split 7.4%
Threshold below which estimated percentages can contain an error equal to the estimate itself: 1%
Average Number of Windows: 11.8
Average Number of Doors: 2.9

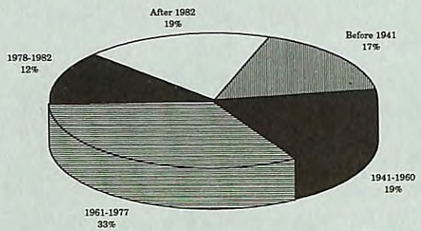
The Housing Stock

Canada is still a low rise, low density country. Of the 10.4 million Canadian households, 69% occupy a house, whether a detached house (57%), an attached house (10%) or a mobile home (2%). 69% have been built before 1977.

How big are Canadian houses?

41% have a heated living area (excluding basement) between 1,000 and 1,500 sq. ft. 31% are less

Distribution of Dwellings According to Year of Construction



than 1,000 sq. ft. and 29% are larger than 1,500 sq. ft. In general, the newer the house the larger it tends to be. It is interesting to note that 14% of older houses (built before 1941) are over 2,000 sq. ft.

48% are one storey bungalows, but only 20% of houses built before 1941 are one storey, compared to 65% of houses built between 1941 and 1977. Multi-level houses (10% of houses) are more common after 1960. Three-quarters of Canadian houses have an attic (74.2%), mostly unfinished.

71% have a full basement; other houses have either a partial basement (11.7%), a crawl space (7.5%), or none at all (10.1%). Two-thirds of basements or crawl spaces are generally fully heated; but only 48% of houses built before 1941 have heated basements.

10% of Canadian houses have a heated garage; the garage is most likely to be attached to the house (7%). In newer houses, built after 1982 14% of houses have attached heated garages.

The average Canadian house has:

- 3 outside doors; about half of these are made of wood (49.3%), while 30% are metal. Half of the homeowners claim to have problems with air leaks around at least some of their doors.

- 11 windows; most are double-glazed (60.9%), some are single-panes with storm windows (22.2%) or even without storm windows (9.8%). Window frames are mostly wood (61.2%), but metal (26.7%) and fibreglass or vinyl (11.9%) are also used.

10% of all Canadian houses have an air exchanger; about 20% of houses built after 1982 have air exchangers.

Improvements that have been made to the Thermal Envelope in Houses:

In nearly 2/3 of houses with basements or crawl spaces home owners have added basement wall insulation, whether fully (42.6%) or partially (25.5%). In 52% of houses, homeowners have upgraded the air-tightness around doors; and 41% upgraded their windows, while roof and attic insulation was upgraded in 38% of the houses. Only 23% of houses have upgraded exterior wall insulation.

More than 1/3 of houses (36.5%) have replaced some of their windows; less than 1/3 of houses (32%) had some of their doors replaced. Basement floors are rarely insulated, either fully (5.7%) or partially (4.1%). The vast majority of household repairs to improve the thermal envelope have been done after 1983.

Heating systems

The most common heating system is a forced warm air furnace (45.8%), followed by electric baseboards (26.7%), central hot water systems (13.9%), wood stoves (7.4%), heat pumps (2.9%) and "others" 3.3% (radiant heating was identified in 1.4% of houses).

What is the average temperature maintained? The daytime average temperature is 20°C (68°F), increasing to 20.6°C (69°F) in the evening, and dropping to 19.1°C (66.3°F) at night. There appears to be little difference in temperatures between electric and gas heating systems, although electric heated homes tend to be slightly cooler.

What is the primary energy source used for space heating? The major source of energy for forced warm air heating systems is natural gas (70% of the cases) followed by oil (16%) and electricity (8%). For hydronic systems it is natural gas (63%) followed by oil (22%) and electricity (13%).

In the case apartments, the picture is different. Electric baseboards heat 44.8% of all apartments, followed by hydronic (32.5%), and hot air systems (17.8%). The hydronic and forced air systems are supplied mostly by natural gas, followed by oil and electricity.

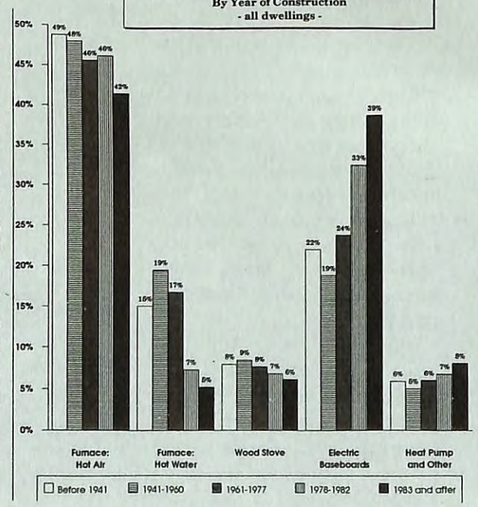
Electricity is growing in popularity as compared to other energy sources in new housing, while the share of oil as principal heating fuel is clearly decreasing.

In 30.4% of houses, the principal heating system is more than 15 years old. Where oil is the principal fuel, 59.7% of systems are more than 15 years old.

Nearly 1/3 of all dwellings use a supplementary heating system; 13.1% of dwellings use this supplementary system for a large portion of their heating needs (i.e. used more than 25% of the time). The systems used range from wood stoves (9.7% of dwellings), electric baseboards (13.5%), portable heaters (12.4%) or other devices (2.8%).

The combination of wood stove and electric baseboards is present in approximately 725,000 houses, or 10% of all houses.

Graph 3.1.1
Percentage of Dwellings
with Specific Type of Principal Heating System
By Year of Construction
- all dwellings -



Air Conditioning

Approximately ¼ of all households use air conditioning during the summer season. This is slightly higher for houses (28.6%) than for apartments (20.8%). The air conditioning system, including the heat pump, is frequently a central system (58.2%) rather than a window or room unit (41.8%).

Household Appliances

The principal refrigerator is on average 9.6 years old; 36.8% are more than 10 years. 18.3% of households have a second refrigerator (the beer cooler?), usually much older (average 18.1 years old); 35.9% of second refrigerators are more than 20 years old.

Cooking appliances are on average 10.9 years old; 24.3% are more than 15 years old. The microwave oven has become a standard appliance, with 79% of houses having one, but they are used mostly to reheat or defrost food as opposed to actual cooking.

Dishwashers are found in 44.1% of households. (The average dishwasher is 8.3 years old).

Three out of five households (60.1%) own a freezer; on average 11.9 years old, with 1/3 more than 15 years old.

79% of households have washing machines; and 73.9% have dryers. About 1/3 of washing machines and dryers are more than 10 years old.

Hot Running Water

Nearly all dwellings have hot running water. 78% of households have an individual water heater, most run on electricity (57.2%) but many use gas (38.4%). The average water heater is 7.6 years old; 26% of water heaters are more than 10 years old. The others are shared hot water heating systems.

When electricity is the energy source, one out of four heaters have add-on insulation (23.2%) as well as insulation around the pipes (25.7%). These energy-saving devices are more rare in gas heaters; as only 18.7% have pipe insulation and 10.9% have a add-on insulation. Almost one in two household with a water heater (45%) have a water-saving shower head. Water faucet aerators are more rare, owned by only 20% of household and water heater.

Lighting

The average household uses a total of 27.1 light bulbs; 24.5 for indoor use and 2.7 for outdoor use. These figures vary noticeably depending on the type of dwelling.

More than one out of two dwellings uses fluorescent bulbs (54%); used more frequently in houses (62.6%) than in apartments (34.9%). Halogen bulbs, a recent arrival, have yet to become a major market force; with less than ¼ of households (22.2%) using them either indoors (17.7%) or outdoors (6.5%).

Other appliances

In the last generation we have seen a large increase in the number of energy consuming appliances. These have had a significant impact on utility energy loads. Something that most of us may be unaware of, many appliances consume energy even when they are turned off (e.g. all those instant on electronic appliances and those with clocks)!

Personal computers are now in 24.5% of all households; 8.8% have electric blankets; 11.8% have waterbed heaters (both of which will be supplying heat to the room); 32% have humidifiers or dehumidifiers; 27% have block heaters (to heat the outside); 5% have fish tanks; 22.% of detached houses have central vacuums.

1993 Survey of Household Energy Use, Efficiency and Alternative Energy Branch, Natural Resources Canada

Did You Know?

♦The average single family houses uses about 10,000 board feet of framing lumber. The same house, if built with engineered wood products, uses about 1,200 board feet of material.

♦A skylight with an area of 2% of the roof area reduces the average thermal resistance of the roof by about 30% - about one third of the heat loss would be through the skylight.

♦At today's production rate the world has 123 years worth of natural gas reserves, 67 years of crude oil reserves and 230 years of coal reserves (according to the US Department of Energy).

Energy Efficient Refrigerator

Looking for an efficient refrigerator? One that doesn't use CFC"s? (Fridges are still one application where CFC's are used, because of their efficiency as a refrigerant).

The Waterloo Greenhome featured the Danish manufactured Vestfrost fridge. In the Waterloo home they had to import the units directly from Denmark.

The unit is not cheap (Can $1,699.) for a 12 cu.ft. fridge/freezer combo, but it is efficient - about 40% less than comparable North American units, and the unit does not conform to standard Canadian dimensions - it's 79" tall, 24" wide.

These energy efficient units are now being distributed in North America by Photocomm, Inc. (Scottsdale, AZ Tel 602-948-8003; Fax 602-483-6431). In Canada, they are available from Energy Alternatives (1-800-265-8898)

High Performance Windows

Advanced House Window Performance

Typically, windows have been a thermal hole in the building - representing a net energy loss. To have a very energy efficient house, the obvious step should be to reduce window areas. But most of us don't want to live in a cave shut off from the outside - even the most boring landscape offers a view and light.

Fortunately, the past decade has seen major changes in the window industry, so much so that you can actually custom design windows to meet your needs: to maximize or minimize solar gain, keep light transmission but filter out UV rays, or whatever. In the future, you will see units that change properties automatically based on outdoor conditions.

Windows today can actually be net energy contributors when considered on an annual basis. The Canadian Standards Association CSA A440.2 Standard includes a procedure a for rating the energy performance of windows. The standard defines how to determine window U-value, solar heat gain coefficient (SHGC) of the total window and Energy Rating (ER).

What is the impact of different windows on the performance of a house?

Enermodal Engineering studied the effect of windows used in the Advanced Houses on the passive solar performance. All ten Advanced Houses used high-performance windows and passive solar design to achieve the tight energy targets. While many high performance windows are commercially available, many of the windows used in the Advanced Houses were prototypes at the time. The windows ranged from double to quadruple-glazed with almost all using low-e coatings, inert-gas fills and insulating spacers.

The **Energy Rating** is a measure that is intended to reflect the overall heating energy impact of a window in a typical residential building. The ER is a heat balance calculated over the season for average Canadian winter conditions averaged over the four cardinal orientations. The ER rating is a standardized comparison like the mileage rating of cars. Performance will vary based on different conditions, locations, etc. The formula is:

Energy Rating = Solar Heat Gain - Transmission Heat Loss - Infiltration Heat Loss

The Energy Rating (or ER) can be positive or negative. A positive value indicates that the window produces a net energy gain over the heating season.

Typical ER values (W/m2)

	Fixed Windows	Hinged Windows
Standard Windows	-18	-29
High-Performance Windows	2	-11

Calculating Passive Solar Contribution

The passive solar contribution is based on the reduction of the heating load and not on the reduction of space heating energy consumption. Comparing savings in energy consumption would be misleading because the heating system efficiency can vary significantly depending on the type of heating equipment used.

For passive solar heating purposes, windows should have a high Solar heat gain coefficient (SHGC). The double-glazed windows, although having poor (i.e., high) U-values have the best SHGC.

The assumed standard window was clear double glazed with 12.7 mm (½") air gap and an aluminum spacer in a typical frame. The standard high-performance window is double glazed low-e coating, (0.09) argon gas fill and insulating spacer in a wood frame.

The HOT-2000 computer program was used to estimate the reduction in heating load due to the use of high-performance windows instead of standard double-glazed windows and from locating the majority of windows on the south side. For each house, five simulations were done. The first run was for the actual or "as-designed" configuration.

For the second simulation, the window properties were changed to values for windows that just meet the requirements of the 1993 Ontario Building Code for electrically heated buildings. The third run assumed Standard double-glazed windows. In the fourth run, standard double-glazed windows were relocated so that there was an equal window area on each of the four sides of the house.

The average passive solar contribution for the Advanced houses is 19 kWh per sq metre of floor area .... On average, each square metre of high-performance window reduced the heating load by 169 kWh annually.

The first part of passive solar contribution is the reduction in heating load due to the use of high-performance windows instead of standard windows. This savings can be found by subtracting the heating load assuming standard windows from that of the actual house. The difference shows the benefit of going beyond double-glazed high-performance windows.

The second part of solar contribution is the reduction in heating load due to design changes that place most of the windows on the south side. These savings can be found by subtracting the heating load of the case which assumed standard windows equally distributed from the case that assumed standard windows with actual window distribution.

It is worth noting that because the houses were very well insulated, the length of the heating season is much shorter. This also means there is less opportunity to use solar gains. In other words, the solar contribution from the windows used in the Advanced Houses would be higher if they were installed in houses that were not so well-insulated.

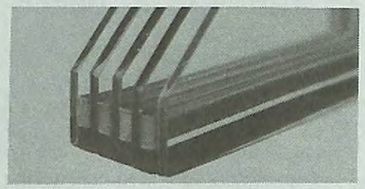
In five of the Advanced houses, the heating load was cut in half by the use of high performance windows and proper orientation to maximize solar gains. The average passive solar contribution for the houses is 19 kWh per sq metre of floor area, of which 85% is due to the use of high-performance windows and 15% is from solar orientation. Using lower cost double-glazed windows on the south-side instead of quadruple-glazed showed only a minor increase in energy consumption. On average, each square metre of high-performance window reduced the heating load by 169 kWh annually.

To increase solar gains, two of the houses had windows selected by orientation: double-glazed on the south-side and quadruple-glazed on the other elevations.

The passive solar contribution (from reduced window heat loss and solar orientation) for five of the Advanced houses is about equal to the actual space heating load. In other words, if these houses used standard windows equally distributed on all four sides, the space heating load would be double.

The average passive solar contribution for the ten Advanced houses was calculated to be 19 kWh/m² of floor area. ☼

Performance Of Windows Used In The Advanced Houses Program.
Report prepared for: Efficiency and Alternative Technology Branch/ CANMET Natural Resources Canada Ottawa, Ontario



R-20 Windows

A prototype window unit with an R-20 insulating glass panel was unveiled by Thermotech Windows Ltd. of Nepean, Ontario at the April '95 Ottawa Spring Home Show.

Why bother? Why go so far? Every industry has it's showcase prototype products that display future directions for the industry. The Thermotech windows underline how far window technology has come in the past few years, and what can come in the future. While an R-20 window pushes the limits of window technology, there will be some circumstances where such high performance windows might be appropriate.

This high performance level is achieved through the interplay of four elements: multiple 'soft' low-e coatings, insulating spacer technology, pultruded fibreglass frames, and xenon gas fills. Xenon gas is used as it provides maximum thermal resistance in a narrow spacing.

The five layers of glass are separated by Edgetech's SuperSpacer, a commercially available silicon foam insulating spacer that has a high insulating value. The window frame, by Accurate Dorwin of Winnipeg, is a standard foam filled pultruded fibreglass which was originally designed for the thicker triple glazing common in the Prairies. The frame has one of the widest glazing cavities available; when used with triple glazing and insulating spacers, this is the most energy efficient window commercially available.

The Thermotech prototype window is not currently in production and no cost figures are available at this time. "Thermotech is making a statement by showing that an R-20 window is not science fiction," company v.p. Stephen Thwaites explains.

Information
Thermotech Windows Ltd.
Tel: 613-225-1101

Letters to the Editor

Re: Is Fibreglass a carcinogen? (Solplan Review, January 1995)

Your Jan. 1995 issue recently came to my attention. Your efforts to inform people about potentially toxic products in modern homes is commendable.

The article from the Canadian Home Builders' Association about fiberglass insulation's possible carcinogenic effects was a typical whitewash of an important subject. The home building groups are, in my opinion, too closely tied to MMMF manufacturing lobbies to objectively discuss this issue. VOF believes the health affects of fiberglass are similar to those as asbestos; a growing pile of medical evidence supports this contention.

Man-made fibers, like fiberglass wool, have a significant added problem of the urea-and phenol-formaldehyde binders which are used in their manufacture. Your otherwise excellent coverage of the formaldehyde issue was thus disappointing, because of the omission of any discussion about formaldehyde off-gassed from fiberglass wool insulation; I have a growing pile of letters complaining about this phenomenon.

Bob Horowitz
Chairman, Victims of Fibreglass
Bryte, CA

Emissions from building materials are always a concern, but especially when those materials are inside the building envelope. As all builders know, we try to build an airtight building envelope for the benefit of a durable structure as well as for energy efficiency. Thus, should there be any emissions from any materials, they are kept out of the heated envelope.

In addition, good building practice requires an effective ventilation system, so that indoor air quality can be maintained. Ed.

Re: Dynamic Windows in Dartmouth NS house (Solplan Review, March 1995)

I want to bring to your attention that the laminar flow HRV windows are on the lower level and not the upper level. This placement helps bring fresh air into the house due to the natural stack effect. If they had been placed on the upper level there would be more of a tendency for air to be trying to pass out through them.

Robert Fraser
Darmouth, NS

Seeing is Believing,
or a tale of two windows

source: Libbey-Owens-Ford's *Under The Sun* Newsletter, Spring 1995 Issue

You've heard much about how changes in glass technology have transformed the performance of windows. Yet many people still ask the question "is low-e glass really worth the extra cost?"

If there are any doubts about the difference, the picture of two windows in this Ontario house should dispel them. The window on the right has conventional glass, the one on the left is a replacement unit with low-e glass.

Eco Design Resource Centre

The EcoDesign Resource Centre offers one of the more comprehensive resources available on environmental design and building with over 350 publications in the library, including books, magazines, newsletters, research reports & videotapes, a library of manufacturers' literature & samples of building products that demonstrate health and environmental merits.

The Centre is a project of the EcoDesign Resource Society (EDRS), a non profit organization established to advance design, building and manufacturing ethics based on principles of ecology. The Centre is supported by grants from public and private sector agencies.

It is located at 201 - 1102 Homer Street in Vancouver, and is open to the public and members of the design, building and manufacturing industries. Starting in June the centre will be open Tuesdays 9-1 pm and Thursdays 3-7 pm. Dial-in access to the computerized library catalogue and product database will also be available in June. For more information call (604) 689-7622.

Construction Corner

Basement wall framing

Basement full height insulation is now very common. It also can create a lot of extra work, and if not done right can create problems.

Wecan Construction Inc, of Shakespeare, Ontario has developed an interesting detail they are now using on all additions and new homes. It has worked extremely well for them, for both R-2000 and standard construction.

This approach is one way of dealing with insulation of heated crawlspaces too!

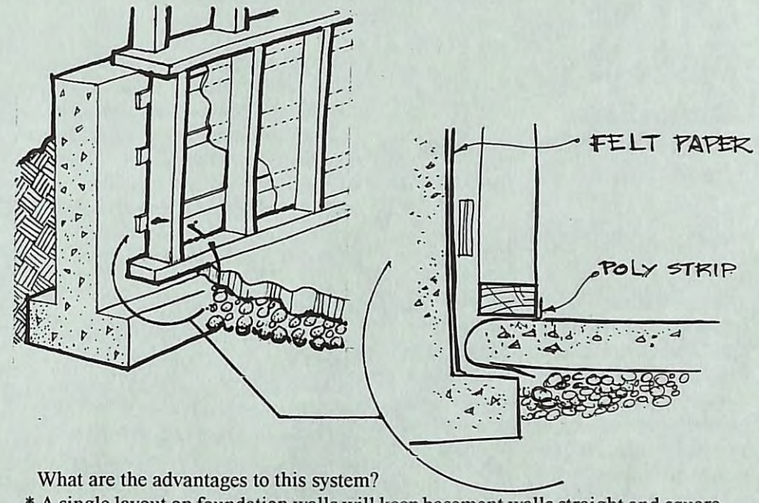
What is the detail? The basement (or crawlspace) furring is laid out and installed at the same time the sole plate is installed.

The framing layout is chalked out on the foundation as usual, but you use a 2" x 10" sole plate rather than 2" x 4" or 2" x 6". Next layout the sole plate for anchor bolts, floor joists layout and for 2" x 4" basement wall studs. (i.e. lay header joists and basement wall plate beside sole plate and complete the layout).

Next, install the 2" x 10" sole plate on the wall with the sill gasket, cut basement studs so that the 2" x 4" bottom plate will form the top of basement concrete floor, nail studs to bottom plate, tip up wall and nail through sole plate to secure top of basement wall studs.

Install a strip of scrap plywood behind the basement wall at the seven foot height with concrete nails. Pull 15 lb. felt paper up behind the wall framing and staple it to the plywood strips, and cut off at the footing level. Then you can install blocking over the tar paper and secure it to the foundation, plumb and secure basement walls.

At this point you're ready to start the main floor framing as normal. The basement is now ready for the concrete floor, which can be poured anytime, using the bottom plate as the levelling strip.



What are the advantages to this system?

* A single layout on foundation walls will keep basement walls straight and square to each other without duplicating layouts.
* A single layout time for anchor bolts, sub-floor headers and basement wall plates.
* A single top plate acts as the sole plate and one basement wall plate.
* A single plate ensures there will be an air seal between the floor assembly and the basement perimeter walls.
* The bottom 2" x 4" plate gives the floor grades for cement floor and a definite screed line.
* All work in the basement is done in the light of day before subfloor assembly is installed.
* 15 lb felt paper installation at the seven foot level ensures that the basement walls can breathe to the outside and ensures that the concrete floor will be poured against felt paper thus ensuring that any condensation will trickle down and under the floor slabs.
* The tar paper and 2' x 4" wall plate ensures that there will be room for concrete floor expansion and that there will be a slip plane between concrete floor and foundation walls. This also provides a small channel so that if there is any leakage through the foundation wall, it will stay outside the finished area of basement (and thus less call-backs for water leakage).
* Uses up scrap plywood.
* The basement walls are ready for wiring, insulation, vapour barrier and drywall, and since all studs are located under the joists, duct work could also run to the floor level if desired and properly done.
* A 2" x 10" plate will give ample room in basement walls for R-13 or R-20 insulation values, as well as adding width to the foundation walls and is much safer to work on. (Considering most sub-floor assemblies are installed before backfilling).

This detail was developed by Conroy Schelhass,
Wecan Construction Inc
Shakespeare, ON N0B 2P0
Tel: (519) 625-8178

Technical Research Committee News

Canadian
Home Builders'
Association

1995 National Building Code

The release of the 1995 version of the National Building Code has been delayed. The code is scheduled for release in September. This is the model code which is accepted in most provinces as their building code, or is the basis for the provincial code with some typically minor modifications.

National Energy Code for Houses

The second draft for public review has now been released. Commentary on the proposed energy code is now being solicited. Deadline for comments is June 30, 1995. This is the time to make your comments. If you want to make any comments, specific to the draft, contact your local Home Builders' association's technical committee, the TRC, or directly to the Canadian Commission on Building and Fire Codes in Ottawa.

The Future of Codes

The Canadian Commission on Building and Fire Codes has adopted a draft strategic plan for dealing with the scope and role of the building code.. CHBA has been supportive in the strategic planning exercise Many of the suggestions made by CHBA have been adopted into the draft paper.

Some of the highlights include:

Tightening the criteria for code change proposals. This will include evaluation of cost implications of proposed changes. Up to this time, this has not necessarily been the case.

Remove requirements for houses in Part 9, and creating a separate housing code for one and two family dwellings.

Freeze the scope of the National Building code, thus eliminating the mandatory reference to energy codes. Similarly, other social agendas such as resource conservation, in particular water conservation measures, will be avoided.

Indoor air Quality

A lot of concern is being expressed about the need to ensure better quality of the indoor environment, to avoid building-in problems. However, there still is a lack of tools to help builders and designers when searching for and selecting products, to ensure that problems can be avoided.

The Institute for Research in Construction (IRC) is undertaking a program of emissions testing of materials. They are setting up test chambers to do performance tests on specific products. Information gained will also be used to help develop a computer program that will help predict the indoor air quality impact of specific products.

This will also contribute to the work of the task force on materials emissions that CMHC has established. The task group is now establishing priorities for work. They are open to suggestions for specific product areas or materials that should be investigated. If you have any specific information needs, or ideas about how or what information should be presented, then contact John Broniek at the TRC.

Similarly, CMHC is developing a training program for indoor air quality inspectors. The objective is to have qualified indoor air quality inspectors to be able to assess air quality problems. The proposed course includes class and field work.

Communications

The TRC is the main forum for information exchange in the housing sector. For many issues, it is at the strategic centre point between manufacturers, regulators and builders. To assist with the information exchange, the TRC is investigating going high-tech and setting up shop on the electronic highway. If anyone has any comments about the viability or usefulness of such a resource, or the kind of information you would like to see on such a service, then contact Ros Monsour at the TRC.

Envirohome

We've reported on the Envirohome initiative of CHBA and Canada Trust. Following on the success of the first demonstration homes, 7 more proposals are being undertaken. These include:

Challenger Homes, Edmonton
Preston Homes, Saskatoon
Sergeant Picard, Thunder Bay
Menard Bros,. Cornwall
Louch Berger, Brockville
BMW Enterprises, Guelph
EG Enterprises, PEI

Flooring Problems

Telegraphing of Underlays is a problem we've reported on in the past. Anyone who is having any problems with underlay is encouraged to contact Ross Monsour at the TRC with specific details. This will assist in a research project that will help resolve the problems.

The Technical Research Committee (TRC) is the industry's forum for the exchange of information on research and development in the housing sector. Membership includes builder members and representatives from industry, standards and governments bodies with an interest in housing. Anyone with a problem, technical question of suggestions for areas that need to be investigated is encouraged to contact their local Home Builder's Association technical committee or the TRC directly.
To contact the TRC:
Canadian Home Builders Association, Suite 200, 150 Laurier Ave. West,
Ottawa, Ont. K1P 5J4
Tel: (613) 230-3060

Mechanical Ventilation Assessment:
1993 Ontario Building Code

Management of indoor air quality in houses has been a major concern in recent years. In 1993 the Ontario Building Code was changed to deal with problems that had been identified with the 1990 version. These included:

* Most builders were opting for exhaust-only ventilation systems, with 'hole in the all' make-up air inlets for pressure equalization.
* Homeowner complaints of cold drafts caused by make-up air inlets
* Concerns about the safety of combustion venting systems (for both wood and gas appliances) especially where make-up air inlets had been blocked by occupants.
* Other problems included high energy bills, poor air distribution, wrong interpretation and execution of Code requirements by trades persons and inspectors.

After these 1993 changes were made, a study was done to see how code compliance was being done, what was the actual ventilation system performance and what was the level of satisfaction experienced by homeowners.

A group of 24 houses located throughout the south-western, central, and eastern regions of Ontario were selected for testing. Field work was done by Buchan, Lawton, Parent Ltd with laboratory assistance from Ortech International. Unfortunately, the sample size was smaller than desired as they were not able to get enough builders to participate. This meant that all possible ventilation system types were not tested.

A ventilation system design must take into account the heating system and other appliances in the house. Four basic systems were identified.

I systems using non-solid fuel fired appliances which are either mechanically vented, induced draft or sealed combustion, and no solid fuel fired appliances.
II same as type 1 but which also include solid fuel fired appliances.
III using heating and ventilation systems designed under Part 6 of the Code
IV electric heating

An attempt was made to test each of four basic ventilation systems options available:

1. Exhaust only, using a dedicated principal fan, with supplemental exhaust fans.
2. HRV delivering supply air to the furnace return plenum and exhausting from wet areas.
3. Simplified HRV option, delivering supply air to the furnace return plenum and exhausting from the furnace return plenum upstream from the HRV supply connection. As there is a public perception that it is necessary to have an HRV if you're going to have a ventilation system, and proposed energy codes will require HRV's in most situations, this kind of system is the cheapest way to install an HRV allowed by the code. However, there is no information on how efficient this kind of system is. Unfortunately, this type of system was not tested in this survey.
4. Fully ducted HRV

Ventilation system performance testing included:

* Measuring both the natural ventilation rate and the total ventilation rate due to natural forces and the ventilation system.
* Recording name-plate information and installation details on all HVAC equipment, (to determine the rated flow capacities).
* Fan de-pressurization testing of the house, to establish the air tightness and the relationship between whole house exhaust and pressure difference across the building envelope.
* Time-averaged air quality testing including 7-day sampling for: airborne particulates, formaldehyde, humidity, and radon.
* Instantaneous, or 'spot' indoor air quality measurements for carbon monoxide and carbon dioxide.
* Pressure measurements to determine how much de-pressurization would be caused by exhaust devices.

Air change tests

As a rule, furnace blowers were operated continuously during testing to improve mixing and to operate the systems as per design intent. In cases where it was not possible to switch on the furnace blower, furnace controls were temporally 'jumpered' to force the fans to operate for the duration of the test.

Of course, if the system had to be altered this way, it would mean that in reality, the house would not get the benefit of the air circulation. It quite likely indicates that the ventilation system would not do an effective job. For the natural ventilation portion of the test (i.e. the ventilation system off) the furnace blower was left operating (if possible).

Homeowners were interviewed face to face to provide a user perspective on the ventilation system. Topics solicited included information on occupancy, how they used their heating and ventilation system and general air quality observations. Homeowner satisfaction rating was based on questions regarding the purchaser's general impressions of the ventilation system with respect to: temperature distribution, noise, general air quality and cost.

The comfort score was based on questions which specifically dealt with air quality and humidity observations. Purchasers were asked for their comments about the tendency for odours to linger, stuffiness (or stale air), mould or mildew, dust levels, window condensation, basement dampness and air that is too dry.

The satisfaction value is subjective, but it does represent the perceived value of the ventilation system to the homeowner.

What was found?

Even though this was a limited survey, it did provide some interesting and disturbing insights. Many code deficiencies were observed.

Most common problems:

- no carbon monoxide (CO) detectors installed in houses with wood burning appliances (as required by code)
- no labelling for centrally located ventilation switch
- no balancing dampers for HRV's
- kitchen exhaust fans with no access for cleaning
- no exhaust back draft dampers or insect screens

In general, installed ventilation system capacity was found to exceed code requirements. Many houses are being over ventilated - which can lead to excessive heat losses and over-drying the house in the winter (which in fact was a common occupant complaint). Houses with exhaust only ventilation systems were not operated continuously (they also had the lowest owner complaints), but also had the lowest measured air quality.

This study suggests that the basic requirements of the Code with respect to house type, ventilation system option and ventilation capacity are being correctly applied in the field. However, there are deficiencies which affect the ease of use and level of ventilation provided. These are related to installation practice, associated with mechanical and electrical trades.

A recommendation is made that consideration should be given to providing training to builders on how to ensure trades are complying with new Code provisions so that tighter quality control can be exerted by builders. Municipal inspectors should also be trained to check specifically for installation deficiencies.

Many houses are being over ventilated . . . leading to excessive heat losses and over-drying the house in the winter

The prescriptive requirements of the code with respect to ventilation rates, when followed, appear to provide for ventilation capacities sufficient to maintain good indoor air quality. Although installed capacity was substantially greater.

The air quality prevalent in the option 1 houses (exhaust only systems) is unacceptable and could be a health concern. The poor air quality appears to be caused by improper use of ventilation equipment by homeowners.

A recommendation was made that information should be provided to purchasers of new homes emphasizing the need for continuous use of exhaust only systems (for a minimum duration per day basis). Consideration be given to provide timers, or other automated controls on principal fans to increase their usage.

Houses equipped with Heat Recovery Ventilator-based ventilation systems tend to be over-ventilated which causes noticeable dryness and occupant complaints. Perhaps the Code could be modified to provide clearer upper limits on installed HRV capacity? This could be accomplished by more thoroughly addressing the subject of HRV set-up. HRVs were also frequently installed without balancing which causes a significant reduction in ventilation and heat recovery effectiveness, so that it may be necessary to amend the Code to provide clearer requirements for balancing HRVs.

The average air tightness of new houses is enough to justify the measures in the Code for the prevention of combustion spillage.

The general level of satisfaction and comfort among home purchasers is high with little variation between systems.

But the big omission in this study that was not addressed was the effectiveness of the different ventilation systems. It's one thing to exchange a given quantity of air over a given time (which is all that codes call for). But such an approach does not necessarily ensure that there is adequate exhaust of bathroom moisture or odours. It does not ensure there will be adequate fresh air to the bedrooms at night. These are the important features for the occupant.

It is also unfortunate that regulatory decisions are being made on the basis of incomplete information (as provided in this study) simply because it is the only information available at present.

1993 Ontario Building Code Mechanical Ventilation Assessment. Final Report, prepared by Buchan, Lawton, Parent Ltd for: The Ontario Ministry of Housing; Ontario Hydro; The Ontario Natural Gas Association; and The Ontario New Home Warranty Program.

Nova Scotia Home Builders Welcome the World

"The Nova Scotia Home Builders' Association has built an R-2000, energy efficient, environmentally responsible model home, to promote sustainable building techniques and products during the upcoming Halifax Summit of world leaders. The project focuses on occupant Health, Energy Efficiency, Resource Conservation, Environmental Sustainability and Affordability.

This profiles Canadian home building expertise as its finest to both delegates and the general public during Nova Scotia's week in the international spotlight. The Nova Scotia House is accessible and barrier-free, and is an example of affordable and sustainable construction using a maximum amount of Canadian products.

It has incorporated special features for energy efficiency and healthier living environments. In addition, emphasis is being placed on "Building for Sustainability", resulting in the use of more environmentally friendly materials and methods of construction. The end

result: a home which is healthier, more energy efficient yet modest in design and cost.

Tours of "Nova Scotia House" will be arranged for June 15-22 (The week of the G-7 Summit). The house will be open to the public, the media, and officials of the Summit. Members of the Nova Scotia Home Builders' Association will be on hand to answer any questions and highlight features of the home.

After the Halifax Summit, the display home will be moved to a permanent site to offer continuing education programs for builders and the public. The display will remain as an ongoing demonstration of Nova Scotian and Canadian products. ☼

For Further Information: Nova Scotia Home Builders' Association Tel: (902) 835-5600

New R-2000 Program Manager

Barbara Mullaly-Pauly has been named the new manager for the R-2000 program. She replaces Jack Cole, who has been the program manager for the past couple of years. Jack has accepted a new posting with Environment Canada.

For further information on the R-2000 Program, contact your local program office, or call 1-800-387-2000 (Fax 613-943-1590)

Indoor Air Quality: Fact or Fiction?

A number of construction strategies and features can be used to ensure good indoor air quality without compromising cost or design. Yet, there is still a lot of misunderstanding about the issues.

Myth: Only the hypersensitive population needs specialized housing.
Fact: *Indoor air pollution can cause or aggravate disease even in individuals not considered hypersensitive. People with allergies, emphysema and other lung diseases would also benefit from clean living environments.*

Myth: The hypersensitive population is a fixed group.
Fact: *Factors such as genetic heritage, age, nutrition, stress and infection may cause changes in chemical or biological tolerance even in a healthy population.*

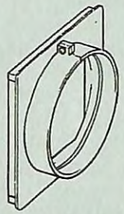
Myth: Hypersensitivity cannot be triggered in healthy people.
Fact: *Some indoor residential chemical exposures have been enough to trigger a state of hypersensitivity in otherwise healthy individuals.*

Myth: Pollutant exposures must be high to cause symptoms.
Fact: *Once hypersensitivity is triggered, by whatever means, individuals can become intolerant to a wide range of exposures, usually as relatively low levels of exposure that were previously will tolerated.*

Myth: Reducing indoor air pollution compromises energy conservation.
Fact: *Many of the steps taken to build energy-efficient houses are also required (or desirable) for improved indoor quality.*

From: Implications of Chemical Hypersensitivity for Housing Design, by Small & Assoc, done for CMHC

Airtight Plumbing Seal



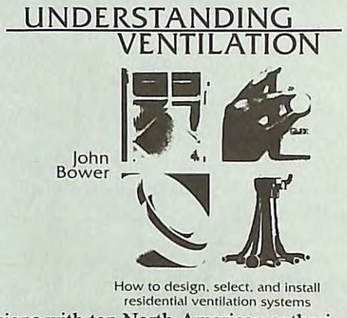
A new and unique product has been developed that will do for plumbing what weather stripping does for doors and windows or airtight boxes do for electrical services. PlumSeal™ seals any pipe penetrations that pass through the vapour barrier or the exterior walls to prevent airflow and moisture migration into walls and ceilings.

PlumSeal™ is simple, inexpensive (list price $3.29), easy to use and meets current building codes to provide energy and cost savings. The product is available in 1½" and 3½" sizes (other sizes to follow).

For Information:
R & S Enviro Products Limited
Keswick, Ontario
Tel: (905) 476-5336 or 1-800-263-2054
Fax: (905) 476-0475

Book Review:

Understanding Ventilation



How to design, select, and install residential ventilation systems

Indoor air often contains excessive amounts of toxic chemicals, mould spores, combustion gases, radon, animal dander, dust mite feces, as well as by-products of human metabolism such as carbon dioxide and water vapour.

It's now becoming evident that the stale, polluted air found in many homes and buildings can be responsible for symptoms ranging form sinus congestion, headache, drowsiness, and inability to concentrate to depression, cancer, immune-system damage, and even death. Indoor air pollution is often ranked as the number one environmental problem facing the USA today.

Why? The primary reason is that more and more houses are being filled with polluting materials - built with ever-increasing quantities of man-made construction products, decorated with synthetic furnishings and maintained with noxious household cleansers. At the same time houses are also being built tighter for greater energy efficiency and for structural durability. That is why Canadian building science has put so much emphasis on ventilation.

In the best of situations, houses that are vented by "natural" ventilation are in reality only supplied with fresh air occasionally and haphazardly. In many cases, this "ventilation-by-chance" just isn't enough.

However, it is possible to build healthier indoor environments, as the R-2000 program has shown. Several strategies can improve the air quality indoors, but all of them must be coupled with some type of planned ventilation system.

A new 432-page book titled *Understanding Ventilation* is an encyclopedia on the subject. It contains all the information needed to master this important subject. This in-depth guide has been written in easy-to-understand language by John Bower, a well-respected expert who has been involved in healthy construction for over 11 years.

Understanding Ventilation is based on comprehensive research, lengthy discussions with top North-American authorities, and extensive personal experience. Bower stresses the need for ventilation to be as integral, expected, and required in houses as plumbing, heating/cooling and electrical wiring.

The book covers every aspect of residential ventilation. Included are sections dealing with background issues such as common indoor air pollutants, how they get into the air, and their potential health consequences. Also discussed are the major kinds of ventilation: natural, accidental, and controlled. The physics of air movement, infiltration and exfiltration and the implications of pressure imbalances are all explained. In addition, Bower demonstrates why loose construction isn't necessarily healthy and how an improperly designed ventilation system can cause a chimney to malfunction.

Specific ventilation systems are also discussed. These include spot ventilation and a wide range of whole-house approaches. Of special note are the book's lengthy bibliography, helpful glossary and extensive listing of ventilation-equipment manufacturers and dealers.

"Understanding Ventilation: How to design, select, and install residential ventilation systems" by John Bower
US $ 31.95
Available from: The Healthy House Institute, 430 North Sewell Road, Bloomington, IN 47408
Tel (812) 332-5073

Building Healthy Homes:

A House For The Environmentally Hypersensitive

CMHC has built a prototype house in Ottawa to demonstrate and evaluate a range of features which can help achieve a clean indoor environment while reducing the cost of housing for people who are environmentally hypersensitive and others who suffer from allergies and respiratory diseases, such as asthma.

Although each individual reacts to a different mix of pollutants, the cleanliness of the air achieved in the CMHC research house should be more than sufficient to meet the indoor air quality needs of the majority of people affected by environmental hypersensitivity. These people have special housing needs as they may suffer partial to total incapacitation, and some are confined to their homes.

The clean indoor environment of this house has been achieved through careful selection of materials and superior ventilation. The ventilation system supplies well-filtered air to the bedroom and living room and removes air efficiently from any location that could have an offensive odour or be a source of excessive humidity.

The house was built off site in a manufactured home plant using conventional wood-frame construction for roof and floor with some new products and materials. The intent was to keep construction costs as close as possible to maximum unit price guidelines for social housing. As a prototype it did cost extra, but in production construction costs should be lower. All materials used in the house are available through building materials suppliers.

Interior Walls and Ceilings

A thin coat of plaster (called veneer plaster) with no additives was applied over "blue board" so no additional paint is required. Veneer plaster uses far less material and labour, and is therefore more affordable. Veneer plaster finishing is common in Eastern Canada.

In the utility room, low-emission paint is used on conventional gypsum board. Dry mix joint compounds which contain fewer preservatives than the more convenient wet preparations, were used.

Floor

Ceramic tile set on an acrylic-modified thin-set mortar over Pyroc a cement bonded particleboard is used throughout the house

Doors

Interior doors are birch veneer on basswood frames, coated with four coats of acrylic sealant. This sealant encapsulates odours from the veneer and core materials but it can't be used on surfaces that are likely to get wet or moist. Exterior doors are standard Steel-Clad insulated doors with double-glazed window inserts

Trim

Basswood is used, sealed with acrylic sealant. Basswood appears to be acceptable to most sensitive people. Commonly used pine is a problem for some.

Cabinets

Cabinets are built of B.C. fir plywood. Countertops and shelves are surfaced with a high-pressure laminate, applied with water-based contact cement. All other surfaces and edges are sealed with four coats of acrylic sealant.

Sufficient coats of sealant can seal odours and vapours, such as from formaldehyde, but may not always be effective.

Bathroom Fixtures

An enamelled steel bathtub is used, rather than a plastic.

Windows

The windows have triple-pane clear glass, argon-filled with insulating spacers and insulation-filled fibreglass frames that have a baked enamel finish. Uncoated glass was used rather than low-E glazing to provide interior light that is as much like natural light as possible.

Some concerns have been identified that the education in UV by low-e glass may be detrimental, especially to people confined indoors for long periods. Research in this area is still ongoing.

Wall Insulation

Rock wool batts (RSI 5.6 (R32)) are used for insulation. This material was chosen because its fibres are larger in diameter than in other fibrous insulation materials and are therefore less likely to disperse particulate contaminants into the air.

Air/Vapour Barriers

Tyvek is used as the air barrier, and 6 ml polyethylene as the vapour diffusion retarder.

Caulking and Insulation

GE Silicone II low-odour caulking is used for doors and windows. (Note that Silicone II for bathtub and tile applications is different from GE Silicone II for doors and windows).

Mechanical and Electrical

Heating and cooling requirements are minimized by high levels of insulation in exterior walls, floor and ceiling, and by orientation of the house so that the largest window area faces south.

Heating is provided by a hydronic floor radiant heating system which has pipes in the floor through which warm water is circulated.

A single tank heats water for both domestic use and radiant heating system, and also tempers the ventilation air via a coil between the first and second stages of the heat exchanger. In this house, an electric tank was used, but an oil or gas unit could be used provided that they were located to completely seal off the combustion appliance from the indoor space.

Ventilation

The ventilation system has been developed to test a combination of features not yet available in any single ventilation appliance.

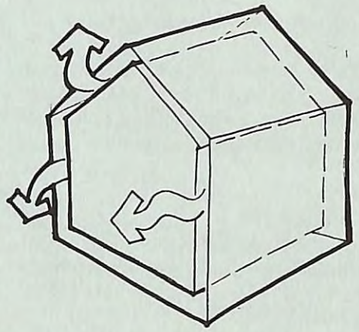
The ventilation unit supplies filtered air to the bedroom and living room at about 18°C. To guarantee the cleanest possible air the bedroom is pressurized. Air is exhausted directly from the kitchen, bathroom, all closets and kitchen cabinets, exterior wall cavity, and multi-purpose cabinet. The utility room is air-sealed to isolate contaminants and noise from the rest of the house.

A displacement ventilation system was used in the bedroom and living room. It operates differently from a conventional system: in a displacement, or stratified, ventilation system fresh air enters near the floor level at a low velocity that does not cause a draft. This arrangement minimizes air circulation in the space and permits stale or polluted air (air exhaled from room occupants and the air surrounding off-gassing appliances) to rise to the ceiling to be exhausted. Because pollutant sources are typically warmer than their surroundings, the immediately surrounding air warms and rises. As a consequence, it is possible to achieve the same removal of air pollutants from a space with lower than normal air flows, providing energy savings also.

Another interesting feature is that the exterior walls built with an inner cavity, so that the bedroom is pressurized to provide the cleanest possible air. The cavity is the space between load bearing studs, with spruce plywood sheathing that's been sealed. The insulation is placed in stand-off studs on the exterior.

Air Filtration

When the system is operating normally, air supplied to the bedroom and living room passes through two filters. The first is a common, washable coarse aluminum mesh filter, located outside the house in an intake/exhaust unit. The second, located in the main ventilation unit is a pleated paper filter that takes out particles down to 0.03 microns with 99.97% arrestance. Neither of these filters will remove odours, so a third filter with four activated charcoal canisters is also installed in the ventilation unit. To overcome the large resistance, and considerable fan power required to maintain air flow, the system design allows this third filter to be by passed, and used only when necessary and with a separate fan.



Humidifier

The project team was unable to find a suitable built-in humidifier so one was not installed. Humidifiers are vulnerable to directly or indirectly generated mould, which, in any house for the chemically sensitive, is absolutely unacceptable.

Drying Closet

This is another innovation. Rather than using a conventional clothes dryer, the house has a drying closet. It's like an indoor clothes line, except that the moisture is exhausted outside; this is an idea that has been used to some extent in Northern Europe. Heat is provided through a copper tube radiator heated by the warm water system. Moist air is removed by the ventilation system. This approach does not wear out clothes, reduces electrical energy and power requirements, and avoids static electricity, avoiding the need for fabric softeners. A further advantage over a typical clothes dryer is that the exhaust air is sufficiently lint-free to allow the air extracted from it to exhaust through the recovery system.

Refrigerator

To avoid a potential mould problem, water produced during the defrosting process is drained directly to the kitchen sink rather than into a drain pan under the refrigerator.

Stove

The electric stove is self-cleaning rather than continuous cleaning as this avoids uncontrolled emissions which occur each time the latter type is uses.

Light fixtures

Ceramic sockets instead of plastic (which may off-gas when hot) were installed together with high efficiency, near-full-spectrum light fixtures where practical. The kitchen sink and utility room have 17-watt full-spectrum fluorescent lights instead of 100-watt incandescent bulbs. ☼

For additional information: Research House for the Environmentally Hypersensitive, Contact Peter Russell, CMHC Tel 613-748-2306; Fax. 613-748-2402

Enviro Safe Cabinets Closes Doors

One of the more promising new developments in the housing sector has been the development of cabinets using environmentally safe and low emissions materials and finishes. Enviro Safe 2000 was a Burnaby, B.C. company that set out to manufacture products that only used environmentally responsible and non-toxic materials. They did considerable research to source components and products.

They attracted a lot of interest among the growing B.C. community of builders and designers concerned about indoor air quality issues, not to mention individuals needing low emissions products for their homes. Their first installation was at the B.C. Advanced House. From that job, they attracted considerable interest and built up a sizeable order book with enquiries from the USA as well as overseas.

The product they were marketing was cost competitive with the established millwork suppliers, being in the mid to upper price range. They showed that environmentally responsible solutions can be marketed. However, it appears that the research and development effort was more expensive than anticipated, and combined with the recent slow down, sales were slower than anticipated so that the principals have found it necessary to close the doors once currently committed jobs are finished.

Current plans are to wind down the company. This may be an opportunity for someone in the millwork field to acquire the remaining assets - in particular the body of research that has been built-up on environmentally responsible products, materials and methods. If anyone is interested in pursuing that, contact Solplan Review and we will be pleased to get you in touch with the key principals. ☼

Is Allergy the new epidemic?

Swedish estimates are that more than one in three Swedes are affected. Canadian estimates are lower - but at 20 to 25% of the population it's still a lot of people!

The incidence of allergy and other hypersensitivities has increased sharply in recent years, to the point these could be regarded as epidemics. Although allergies may not be as life threatening as infectious viral diseases such as Ebola, typhoid, polio, TB or AIDS, or any other disease, they do impact the quality of life of those who suffer.

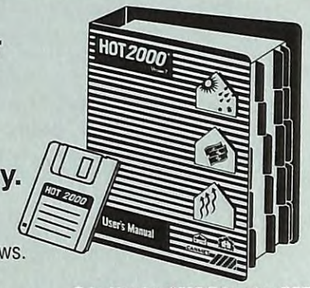
What makes life frustrating for allergy sufferers is that some reactions may be triggered by a complex interplay between various causes which are not yet fully known, and which medical doctors have a difficulty in diagnosing. What is recognized now is that some irritants are man-made synthetic products, and exposure over time can sensitize some people.

Typically, several measures must be employed to counteract and alleviate allergy and other hypersensitivity. It is known that the building industry can have a hand in dealing with the issues, as many irritants originate in the materials used in buildings.

There is still a need for more research, but with an increased awareness on the part of the industry and the public, healthier built environments can be achieved by careful attention to design and materials selection. ☼

HOT2000

HOT2000, the popular software, continues to offer builders and architects maximum flexibility when designing homes, such as R-2000, for energy efficiency.



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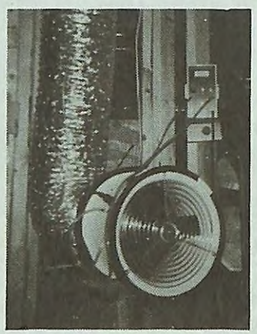
Quality Control: testing duct leakage



Tests have shown that up to 49% of airflow may be lost through leaks - which is why some duct runs may deliver no air or heat when you want it. Which is why it is important to seal ducts. Fortunately,. it is possible to test how airtightness ducts are. This is done with equipment that is similar to a whole house blower door (as is used for compliance with the R-2000 program), except that the unit - the Duct-Blaster, is smaller, specially designed to measure duct leakage.

Duct leakage is tested by pressurising or depressurising the duct after all the grills have been closed. Readings are precise because the unit is operated at the same static pressure (0.2" w.g.) that each exhaust or supply duct would experience when an HRV is hooked up to it. The gauges read duct pressure and fan pressure, and a cfm reading can be achieved by use of a conversion chart. This cfm is the volume of air leaking through the duct.

The unit can also be used to measure the supply or exhaust flow at the furthest duct run.

The whole exercise will take about 30 - 45 minutes.

Eneready Products, a BC ventilation equipment distributor does spot checks on their authorized installers. They have established an allowable limit of air leakage of 5 cfm per branch, and a minimum air flow not less than 40 cfm at the grille on the longest exhaust duct run. Neither of these levels can be attained unless the ducts are sealed.

The Duct Blaster is manufactured by the Energy Conservatory, the same company that manufactures the Minneapolis Blower Door.☼

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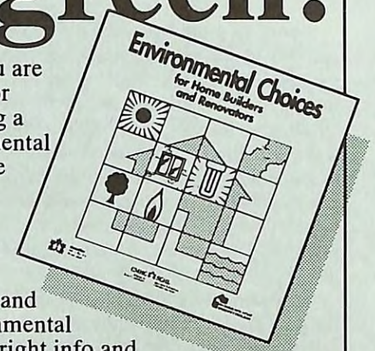

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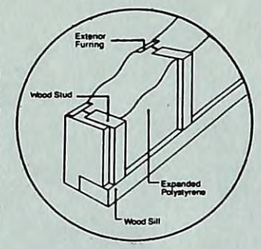

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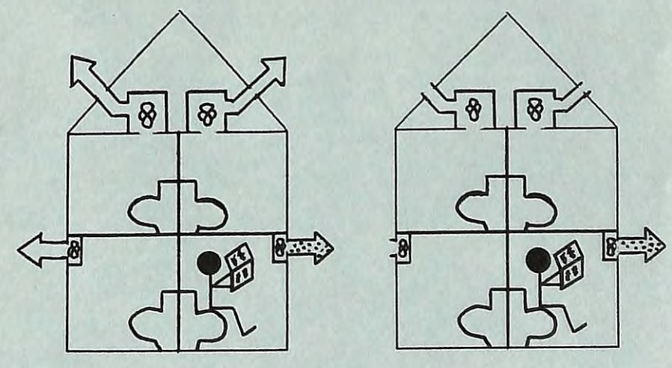

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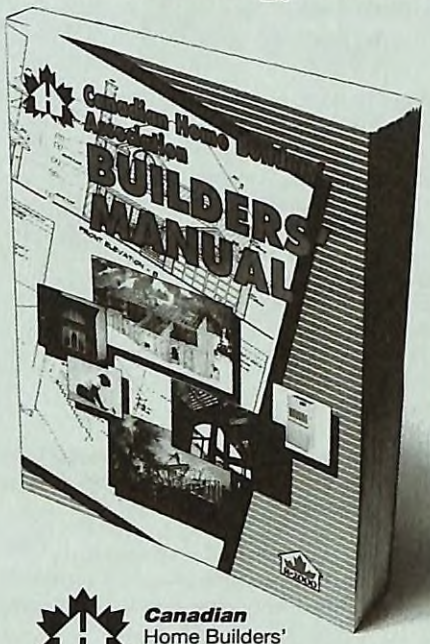

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